

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
CHEAH

Serial No.: 09/863,652

Group Art Unit: 2827

Filed: May 22, 2001

Examiner: David A. Zarneke

For: MULTI-TIERED LEAD PACKAGE
FOR AN INTEGRATED CIRCUIT

Attorney Docket No.: 9818-050-999

RESPONSE TO OFFICIAL ACTION MAILED JUNE 12, 2002

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants submit the following remarks in response to the Office Action mailed June 12, 2002, in the above identified application.

A Petition for Extension of Time is enclosed requesting that the time for filing a Response to the Office Action be extended for a period of three months from September 12, 2002 to and including December 12, 2002.

REMARKS

Claims 1-13 and 20-27 are pending in this application.

The Examiner has rejected Claims 1-7 and 20-26 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,265,762 to Tanaka *et al* (Tanaka).

The Examiner also rejected Claims 8 and 27 under 35 U.S.C. 103(a) as being unpatentable over Tanaka as applied to claims 1 and 20 above.

The Examiner also rejected Claims 9-13 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,905,299 to Lacap (Lacap) in view of Tanaka.

As semiconductor die sizes have become smaller, bond pad pitches have become smaller, bond wire lengths have become longer and wire-to-wire separations have become smaller. At the same time bond wire diameters have also become smaller. As a result, the wires are relatively flexible and prone to contact each other to form short circuits when liquified molding materials flow over the top of the die.

To prevent this from happening, the present invention provides an intermediate lead finger to which an intermediate portion of a bond wire is coupled (independent Claim 1), or attached (as in independent Claim 9) or affixed (as in independent Claim 20). (*See* Specification at 4, ll. 17-18.) As a result, the movement of the bond wires is more limited because the bond wires are now effectively divided into two shorter portions. (*See* Specification at 4, ll. 19-20.) The shorter bond wire segments have greater structural integrity, thereby reducing the chance of creating a short with an adjacent bond wire and otherwise operating to withstand mechanical stress. (*See* Specification at 4, ll. 23-26.)

Claim Rejections - 35 U.S.C. §102(e)

The Examiner states in his rejection of Claims 1 and 20 that Tanaka teaches “a wiring support (15) positioned between the package lead and the pad electrode that is attached to the intermediate portion of the bond wire (Figure 11).” (*See* Office Action at page 3, second paragraph (June 12, 2002).) However, after careful examination of the Tanaka specification, the Applicant can not find any teaching in Tanaka that the bond wire be attached to the wiring support 15. Moreover, in one embodiment, Tanaka explicitly teaches that the wire supports 15 are retracted from the slits 17 after wire bonding is complete. (*See* col. 10, ll. 60-61 of Tanaka.) This embodiment of the Tanaka device clearly shows that Tanaka does not disclose, teach or suggest attaching wire bonds to the wiring supports or intermediate lead fingers as required by the present invention. Rather wiring supports 15 are simply used to keep a loop of wire at a fixed height while the wire is bonded. (*See* Tanaka, col. 10, ll. 31-36.)

In contrast to applicant's invention, the bond wires in Tanaka are not attached to the wiring supports 15; and indeed the wiring supports can be removed altogether from the structure. Therefore, the device of Tanaka does not solve the problem of wire shorts as effectively as the present invention.

Consequently, Tanaka does not disclose a semiconductor package comprising an intermediate lead finger coupled, attached or affixed to the bond wire as required by independent Claims 1, 9, and 20 and these Claims cannot be rejected under 35 U.S.C. §102(e) as being anticipated by Tanaka.

Claims 2-7 which are dependent from the independent Claim 1 and claims 21-26 which are dependent from the independent Claim 20 incorporate all the limitations of these independent Claims and likewise cannot be rejected under 35 U.S.C. §102(e) as being anticipated by Tanaka.

Claim Rejections - 35 U.S.C. §103(a)

To establish a *prima facie* case of obviousness, three basic criteria must be met:

- 1) there must be some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
- 2) there must be a reasonable expectation of success;
- 3) the prior art reference must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Claims 8, 27.

The Examiner has rejected dependent Claims 8 and 27 under 35 U.S.C. §103(a) as being unpatentable over Tanaka. Claim 8 is dependent on the independent Claim 1 and Claim 27 is dependent on the independent Claim 20. As shown above, Tanaka does not disclose, teach, or suggest all the limitations of independent Claims 1 and 20. Therefore dependent Claims 8 and 27 are patentable under §103(a) over Tanaka.

Claim 9.

The Examiner also rejected Claims 9-13 under 35 U.S.C. §103(a) as being unpatentable over Tanaka in view of Lacap.

At page 4, last paragraph of the Office Action of June 12, 2002, the Examiner acknowledges that

“Lacap fails to teach the attachment of an intermediate lead finger to an intermediate lead finger mounting substrate, wherein the intermediate lead finger is positioned between the package lead and the bond pad and attached to an intermediate portion of the bond wire.”

However, as pointed out above, Tanaka likewise fails to teach the attachment of an intermediate lead finger to an intermediate portion of the bond wire. Since neither Tanaka nor Lacap, either taken alone or in combination, discloses, teaches, or suggests all the limitations of independent Claim 9, Claim 9 is patentable under 35 U.S.C. §103(a) over Tanaka in view of Lacap.

Claims 10-13.

Claims 10-13 are dependent on the independent Claim 9. As a result, dependent Claims 10-13 are patentable under 35 U.S.C. §103(a) over Tanaka in view of Lacap.

CONCLUSION

In view of the foregoing, applicants believe that all of the claims are now in condition for allowance and respectfully requests the Examiner to pass the subject application to issue. If for any reason the Examiner believes any of the claims are not in condition for allowance, he is encouraged to phone the undersigned at (650) 849-7777 so that any remaining issues may be resolved.

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Aside for the fee for the Extension of Time, no additional fee is believed due for filing this response. However, if a fee is due, please charge such fee to Pennie & Edmonds LLP's Deposit Account No. 16-1150.

Respectfully submitted,

Date December 11, 2002

 24,615

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